

280 Faraday's **Researches**

could easily be observed; the alkali gradually became turbid, for the protoxide first formed was dissolved, and becoming peroxide by degrees, was deposited, and rendered the liquid dull and yellow.

937. *Dilute sulphuric acid* (923).—Iron, tin, lead, and zinc, in this electrolyte, showed the power of heat to produce a current by exalting the chemical affinity, for the hot side was in each case positive.

938. *Dilute nitric acid* is remarkable for presenting only one case of a metal hot and cold exhibiting a striking difference, and that metal is iron. With silver, copper, and zinc, the hot side is at the first moment positive to the cold, but only in the smallest degree.

939. *Strong nitric acid*.—Hot iron is positive to cold. Both in the hot and cold acid the iron is in its peculiar state (832, 989).

940. *Dilute muriatic acid: i volume strong muriatic acid, and 29 volumes water*.—This acid was as remarkable for the number of cases it supplied as the dilute nitric acid was for the contrary (938). Iron, copper, tin, lead, zinc, and cadmium gave active circles with it, the hot metal being positive to the cold; all the results were very striking in the strength and permanency of the electric current produced.

941. Several cases occur in which the hot metal becomes *negative* instead of positive, as above; and the principal cause of such an effect I have already adverted to (906). Thus with the solution of the *sulphuret of potassium* and zinc, on the first immersion of the wires into the hot and cold solution there was a pause, *i.e.* the galvanometer needle did not move at once, as in the former cases; afterwards a current gradually came into existence, rising in strength until the needle was deflected 70° or 80°, the hot metal being *negative* through the electrolyte to the cold metal. *Cadmium* in the same solution gave also the first pause and then a current, the hot metal being negative; but the effect was very small. Lead, hot, was negative, producing also only a feeble current. Tin gave the same result, but the current was scarcely sensible.

942. *In dilute sulphuric acid*.—Copper and zinc, after having produced a first positive effect at the hot metal, had that

reversed, and a feeble current was produced, the hot metal being negative. Cadmium gave the same phenomena, but stronger (906).